

71662147.APP
SEQUENCE LISTING

<110> JOHNS HOPKINS UNIVERSITY
ROTHSTEIN, JEFFREY D.
CHUNG, DOROTHY

<120> NEUROPROTECTION WITH BETA-LACTAM COMPOUNDS

<130> 46594-0004-01-US

<140> PCT/US2004/035011

<141> 2004-10-21

<150> 60/513,037

<151> 2003-10-21

<150> 60/541,589

<151> 2004-02-04

<160> 4

<170> PatentIn Ver. 3.3

<210> 1

<211> 4696

<212> DNA

<213> Homo sapiens

<400> 1

aaaaccacca	gggttgttgc	tggaaagttt	ttattcctgg	attaaaggca	aggatcagcc	60
tgtatttttag	caatttcttt	ttaagggttaa	tgtcccatgc	gccacctact	tctggggccc	120
tgttccagcc	cttcttttatg	tgttgaccac	ttctaggtcc	agcacttccc	aactctgctg	180
cgcagtggac	tcaatccccct	gggaagtcct	ttaaaaaatgc	ccaagtcagc	ccccgcctac	240
ccccaagat	gcatggacca	gaaatctctg	aaagggtggcc	tgagtattac	tattttctaa	300
aaggctctct	cagaccattt	taatgggcac	ccagtgttga	aaataactgc	tccagtttgt	360
taaaaaataa	ttggtgtgaa	tattggcaaa	agccctctgg	cacaaagaaa	gagaaccagt	420
ttcttctagc	taatgtttgt	tagccagaat	tatctgtggc	atagtccatg	tgacttaata	480
gacctgggtct	tccagggcag	ctgaatgcaa	atgtttctca	cgtgtagaac	gggatgtcag	540
ggcttacaga	gaaagtggga	aactggaatg	atgactccat	ctaattcggc	catgctggat	600
gattcacctg	gattctctca	tgtcctgagc	attgaaaaca	taatgaagag	tttttaaatt	660
gaatgtttaa	aagagtgaag	acaactccat	ccctttttct	gtttcctttt	accttgtatt	720
tatgtaccac	caggtacctt	gctcttgga	gtgagcgtga	atgaatggca	cagctcagcc	780
cctgaagcct	gtgtgcagag	attgagggat	tgtgatggag	tagttcattc	atgctcatgt	840
taaggggggt	gctaatagca	gactagtgtc	cctgcgatta	ttaatatcta	gggtctgggac	900
agattgtgat	ggcttctttt	ccagtgtgca	cctcagcaga	aagggaaata	gaaaacccta	960
acttgtaaag	ttagacaatt	agactgtaaa	gtttgtatat	gtgacaactt	cagatacaaa	1020
gacacacact	taccctttgac	ggggccttaag	aggagagtgt	caaacataat	accaaagtga	1080
aagaagatag	ctcttcatct	acaaattatt	tttaaacaca	tttaccaggt	taaacaataa	1140
ctaatttttc	ggaagagaag	agtaccctaa	gtcaaatgcc	ctaagacgaa	gagatgctta	1200
tggcattttt	ttttaataaa	agaaaatgca	aagttagagt	ggttctgaag	gaacctagga	1260
tgaataaggt	acagacatga	ttattcta	ggtgcagaca	ggattgagag	agaagggggg	1320
aggggagaga	tggagaaagg	catggatgga	agatgacgtt	tggattcaga	ttttggaaag	1380
gagagtaaag	gaaggaggta	agcagagatt	tattttttta	attttattta	tgtgttttcc	1440
cctctttttc	ttgttatttt	tctcatctgt	ctgttcatac	ttggatatatt	tgtccaataa	1500
actatcttct	aaggactctg	aaaatgcact	gaatattttt	ggaggggttta	ctgggggtgcc	1560
agacgccact	ttaggagttt	tacatatcct	ctccatttca	tttagttctc	ttagcacaga	1620
gaagtgggag	aagatagttc	catttttacag	gtgggatgaa	gagagagatg	gaggaatttg	1680
ccccagggtta	ctcagctaga	aggtggtgaa	gaactcaagc	cttcggatat	cagcgcctgg	1740
catttaacta	ccaatcggtc	ctgctgggac	tccggctcct	ctggcaccat	ccccgggacc	1800
tactcagaga	gtttgcacgt	ggccggctgc	gttccatcgt	ctaacaaggt	ccagcacagc	1860
gcaaattccga	agatcgtcta	ccccggggaa	aaagagagtc	tgtttaattc	tcctgtggcc	1920
ctccaagtga	gttcttttgg	gttccattgc	ctagacgagg	aaagtgaggc	tttgcttgct	1980
ctgcgctcac	agggctcggc	agtagtggga	ccctaggttc	ctgcagtatt	ccagagataa	2040
tcaaagctgc	acaggtctcg	tcatttttat	gcaaaggcgt	ccggaaggct	cgaactctcc	2100
cttgacacaag	cccatctgtc	tctgtgcgcc	gtccccggga	cacggaagca	ggcggcgagc	2160
agcgccgagt	gggtggagaa	ccgtccccgc	ccactcaccc	ctcgccaac	tctccgcgcc	2220
ttctcagccg	gcacccacga	ggccgacctc	tctcggccta	aaaaaaaaaa	aaaaaaatcc	2280
cggcctcccc	tgcaccccg	ccgccgcccc	cagggagctg	cattaatatt	aatctcgtcg	2340

71662147.APP

aataattgaa	ggccagagat	ttattcgagc	ttcggcgggg	gagggagcgc	agctgggccc	2400
cgtttaggct	gcaccacccg	cgtgttttcag	ccgctcgact	ccgctggacc	tgggaccccc	2460
agacgtggga	ggatgggggtg	gggtgtgcctg	cctgtgagtt	tgggggtgag	tgtgagctga	2520
agcgggtgct	ccgggggagtg	aggagggagc	gccaggggct	gctccagggg	ggcggagacg	2580
gaggggcatc	ccgggtctcc	gcgcggtcgc	ctgcgcttca	ccccgcacgg	ggtgacctgg	2640
ggccacgcgg	gcttcagggg	aaacaatagc	tactccttag	atcctgggct	cctgccaccg	2700
gctgcccga	ccttcccga	cgagcggcgg	ggcctctttt	cttatttggc	taatttatgg	2760
cgagaggctg	ggggaaggga	tggcagagga	gggaccgcga	ctgaaaaatg	gggcgggggg	2820
cggcggttaa	aggagtgtcc	cgaggcggcg	gcgcgggtga	tgtagctctt	cgacgaaaat	2880
agagagggat	cgcctgcaaa	tccccagctc	cggcggggct	aaaccttgca	atccctccct	2940
ggccggcgcc	gagccagagc	gcagcggcct	ccaccgcctc	cccaggcgcg	cacacacccg	3000
cacacgcgca	cgcacgctca	ccgtcctctg	ccaccactct	ctgctcccgc	cactcgccgc	3060
gccccgcgagc	cccgcagcaa	agcacagggtg	gcagcggctg	caggggagcg	tcgcccgcgt	3120
gcgccttctc	gcagccctgg	gcgcctcgtc	ctctcgggga	agccaccctc	ggagcccccg	3180
gagctccccg	ccaagcgcca	tccccgcggg	cggaggggag	cgcgggtcgc	gcgcctgtga	3240
gagccgggac	gcgggattga	gccccagaga	gcctcctgag	cccgttgagg	cgctaaaggg	3300
cttaccctcg	aggggggtgg	aaggggcggg	agaggctcct	cttaaatacc	gctcccggcc	3360
gcacttcgag	ctcaccctcg	cgtccgcttt	ctccctcgcc	cacagctgcc	ggatagtgtc	3420
gaagaggagg	gggcttccc	cagaccatgg	catctacgga	aggggtgagg	gatttttatc	3480
tgtaccgcg	ggaaagcggg	gtcacgcgcg	gggtggtggc	gcccctatcc	gggatgcgga	3540
tagagaggcg	gcggcgcgcg	gcctcggagg	tgggtggcga	gccgtagctt	ggctggggat	3600
gggatggtgg	ggaggggatt	gattttcttt	cctggagatt	gctgcttaat	cctttgaaaa	3660
tgcgagagg	ggaggggtgt	tttattttga	taaaaagggt	aagggtgcgt	gggggcctga	3720
gagtgtgagg	aagaaatcct	cttgagggtta	cttttgggat	ttcaaaaaca	taggggattg	3780
ggcatagtgt	gagcagacac	cggggtagca	gcgcctggag	cgcgccgccc	caggcccag	3840
gcgggcttgc	aggtggtgcc	ggctcggaag	gaatgagcca	agacagggcc	ctggggcggg	3900
gcaaggacca	gcgcgcgcgg	ccttgaacgc	caggtttgca	gagtcgccat	ggagatgctg	3960
ggcccgtccc	gatcggctct	tgtccctgga	aggcggaatc	tccctggcta	gctctaagga	4020
aggggtgga	agatttgggt	gcttcccggg	aggcgggaaa	acgtgtggtt	tgggacaagg	4080
gcaggagtgc	ccagactcca	gcgggcaggg	atagcattgg	cttccctatt	cagcccagg	4140
atctggagtc	gtgtcctgcc	tcccaagatt	ccagctggca	tggggaaagc	tccctcgcag	4200
tgataactaa	agacaattgt	cttttagcaag	agacagaagg	ggctgcaggg	ggcaaaagga	4260
ttctttgaat	actcacacat	caaaggaaag	gtccacagag	tccttgagcc	agtatctccc	4320
agaaaacttt	ttgggcttcg	tagaacctga	gtggcaatga	aaagactggg	cagctcagcc	4380
ctttggttaa	ttcccaaaat	tgcagttact	cacttgcaag	cgatcacaaa	atccatgtta	4440
tgtgaaaagc	aaatatcagg	ggcttctctg	ggctcaagtg	gtggtgttgg	cattttccag	4500
tttctcctaa	gaaattttac	caactccgca	ggcttgtttt	aggggaatgg	atctctaacc	4560
aggttgaaga	ctgtggtatc	aaagccagat	ctctagactg	caatctccaa	tagaaggaaa	4620
atatttctag	aactgtctct	ctgtccagga	gaagggaattc	cagcacactg	gcggccgtta	4680
ctagtggatc	cgagct					4696

<210> 2
 <211> 2718
 <212> DNA
 <213> Homo sapiens

<400> 2	tcttggcagt	gagcgtgaat	gaatggcaca	gctcagcccc	tgaagcctgt	60
ggtaccttgc	tgaggggattg	tgatggagta	gttcattcat	gctcatgtta	aggggggtgc	120
gtgcagagat	ctagtgtccc	tgcgattatt	aatatctagg	tctgggacag	atttgtatgg	180
taatatgcaga	agttgccacc	tcagcagaaa	gggaaataga	aaaccctaac	ttgtaaagt	240
cttcttttcc	actgtaaagt	ttgtatatgt	gacaacttca	gatacaaaga	cacacactta	300
agacaattag	ggcttaagag	gagagtgtca	aacataatac	caaagtgaag	gaagatagct	360
cccttgacgg	aaattatttt	taaacacatt	taccagggtta	aacaataact	aatttttctg	420
cttcatctac	tacccaaagt	caaatgccct	aagacgaaga	gatgcttatg	gcattttttt	480
aagagaagag	aaaatgcaaa	gttagagtgg	ttctgaagga	acctaggatg	aataaggtag	540
ttaaataaag	attctaattgg	tgcagacagg	attgagagag	aaggggggag	gggagagatg	600
agacatgatt	tggatggaag	atgacgtttg	gattcagatt	ttggaaaagga	gagtaaagga	660
gagaaaggca	cagagattta	ttttttaaat	tttattaatg	tgttttcccc	tctttttctt	720
aggaggtta	tcatctgtct	gttcataact	ggatattttg	tccaataaac	tatcttctaa	780
gttatttttc	aatgcactga	atattttttg	agggtttact	ggggtgccag	acgccacttt	840
ggactctgaa	catatcctct	ccattttcatt	tagttctctt	agcacagaga	agtgaggagaa	900
aggagtttta	ttttacaggt	gggatgaaga	gagagatgga	ggaatttgcc	ccagggttact	960
gatagtccca	gtggtgaagc	actcaagcct	tcggaatatca	gcgcctggca	tttaactacc	1020
cagctgaaga	gctgggactc	cggctcctct	ggcaccatcc	ccgggaccta	ctcagagagt	1080
aatcggtcct	ccgggtcgcgt	tccatcgtct	aacaaggctc	agcacagcgc	aaatccgaag	1140
ttgcacgtgg	ccggggaaaa	agagagtctg	tttaatttct	ctgtggccct	ccaagttagt	1200

71662147.APP

tcttttgggt	tccattgcct	agacgaggaa	agtgaggctt	tgcctgctct	gcgctcacag	1260
ggtcggcaag	tagtgggacc	ctaggttctt	gcagttattc	agagataatc	aaagctgcac	1320
aggtctcgtc	atttttatgc	aaaggcgtcc	ggaaggctcg	aactctccct	tgcaacaagcc	1380
catctgtctc	tgtgcgccgc	ccccgggaca	cgggaagcagg	cggcgagcag	cgccgagtgg	1440
gtggagaacc	gtcccccgcc	actcaccctt	cggccaactc	tccgcgcctt	ctcagccggc	1500
acccacgagg	ccgacctctc	tcggcctaata	aaaaaaaaaa	aaaaatcccg	gcctcccctg	1560
caccccgccc	gccgccccca	gggagctgca	ttaatatata	tctcgctgaa	taattgaagg	1620
ccagagattt	attcgagctt	cggcggggga	gggagcgcag	ctgggcccgc	tttaggctgc	1680
accacccgcg	tgtttcagcc	gctcgactcc	gctggacctg	ggacccccag	acgtgggagg	1740
atgggggtgg	tgtgcctgcc	tgtgagtttg	gggggtgagt	tgagctgaag	cgggtgctcc	1800
gggggagtga	gagggagcgc	caggggctgc	tccagggagg	cggagacgga	ggggcatccc	1860
gggtctccgc	gcggtcgctt	gcgcttcacc	ccgcacgggg	tgacctgggg	ccacgcgggc	1920
ttcaggggaa	acaatagcta	ctccttagat	cctgggctcc	tgccaccggc	tgcccaagcc	1980
ttcccggacg	agcggcgggg	cctcttttct	tatttggtta	atztatggcg	agaggctggg	2040
ggaagggatg	gcagaggagg	gaccgcgact	gaaaatgggg	gcggggggcg	gcggttaaa	2100
gagttgcccg	aggcggcgcc	gcgggtgatg	tcagctctcg	acgaaaatag	agagggatcg	2160
cctgcaaatc	cccagctccg	gcgggggcta	accttgcaat	ccctcccctg	ccggcgccga	2220
gccagagcgc	agcggcctcc	accgcctccc	caggcgcgca	cacacccgca	cacgcgcacg	2280
cacgctcacc	gtcctctgcc	accactctct	gctcccgcga	ctcgccgcgc	ccgcgagccc	2340
cgcagcaaa	cacaggtggc	agcggctgca	ggggcgcatc	gccggcgctg	gccctcctgc	2400
agccctgggc	gcatcgctct	ctcggggaag	ccaccctcgg	agcccccgga	gctccccgcc	2460
aagcgccatc	cccgcggggc	gaggggagcg	cgggtgcgcg	gccgtggaga	gccgggacgc	2520
ggattagcgc	ccgcaggagc	ctcctgcgcc	cgttgaggcg	ctaaagggct	taccccgag	2580
gcgggtggaa	gggcggggcag	aggctcctct	taaataccgc	tcccggccgc	acttcgcgct	2640
caccccggcg	tccgctttct	ccctcgccca	cagctgcccg	atagtgtga	agaggagggg	2700
gcgttcccca	gaccatgg					2718

<210> 3
 <211> 2454
 <212> DNA
 <213> Homo sapiens

<400> 3	tctttggcagt	gagcgtgaat	gaatggcaca	gctcagcccc	tgaagcctgt	60
ggtacacattgc	tgagggattg	tgatggagta	gttcattcat	gctcatgtta	aggggggtgc	120
gtgcagagat	ctagtgtctc	tgcgattatt	aatatctagg	tctgggacag	atttgtatgg	180
taatagcaga	agttgccacc	tcagcagaaa	gggaaataga	aaaccctaac	ttgtaaagtt	240
cttctttttc	actgtaaagt	ttgtatatgt	gacaacttca	gatacaaaaga	cacacactta	300
agacaattag	ggcttaagag	gagagtgtca	aacataatac	caaagtgaag	gaagatagct	360
cccttgacgg	aaattatttt	taaacacatt	taccaggtta	aacaataact	aatttttctg	420
cttcatctac	tacccaaagt	caaatgccct	aagacgaaga	gatgcttatg	gcattttttt	480
aagagaagag	aaaatgcaaa	gttagagtgg	ttctgaagga	acctaggatg	aataaggtac	540
ttaaataaag	attctaattg	tgacagacag	attgagagag	aaggggggag	gggagagatg	600
agacatgatt	tggatggaag	atgacgtttg	gattcagatt	ttggaaagga	gagtaaagga	660
gagaaaggca	catagattta	ttttttaaat	tttattaatg	tgttttcccc	tctttttctt	720
aggaggttaag	tcactctgtc	gttcatactt	ggatattttg	tccaataaac	tatctttcta	780
gttatttttc	aatgcactga	atattttttg	agggtttact	ggggtgccag	acgccacttt	840
ggactctgaa	catatcctct	ccatttcat	tagttctctt	agcacagaga	agtgggagaa	900
aggagtittt	ttttacaggt	gggatgaaga	gagagatgga	ggaatttgcc	ccaggttact	960
gatagtccca	gtggtgaaga	actcaagcct	tcggatatca	gcgcctggca	tttaactacc	1020
cagctagaag	gctgggactc	cggctcctct	ggcaccatcc	ccgggaccta	ctcagagagt	1080
aatcgggtcct	ccggtcgcgt	tccatcgtct	aacaaggctc	agcacagcgc	aaatccgaag	1140
ttgcacgtgg	ccggggaaaa	agagagtctg	tttaattctc	ctgtggccct	ccaagtga	1200
atcgtctacc	tccattgcct	agacgaggaa	agtgaggctt	tgcctgctct	gcgctcacag	1260
tcttttgggt	tagtgggacc	ctaggttctt	gcagttattc	agagataatc	aaagctgcac	1320
ggtcggcaag	atttttatgc	aaaggcgtcc	ggaaggctcg	aactctccct	tgcaacaagcc	1380
aggtctcgtc	tgtgcgccgc	ccccgggaca	cgggaagcagg	cggcgagcag	cgccgagtgg	1440
catctgtctc	gtcccccgcc	actcaccctt	cggccaactc	tccgcgcctt	ctcagccggc	1500
gtggagaacc	ccgacctctc	tcggcctaata	aaaaaaaaaa	aaaaatcccg	gcctcccctg	1560
acccacgagg	gccgccccca	gggagctgca	ttaatatata	tctcgctgaa	taattgaagg	1620
caccccgccc	attcgagctt	cggcggggga	gggagcgcag	ctgggcccgc	tttaggctgc	1680
ccagagattt	tgtttcagcc	gctcgactcc	gctggacctg	ggacccccag	acgtgggagg	1740
accacccgcg	tgtgcctgcc	tgtgagtttg	gggggtgagt	tgagctgaag	cgggtgctcc	1800
atgggggtgg	gagggagcgc	caggggctgc	tccagggagg	cggagacgga	ggggcatccc	1860
ggggagtctg	gcggttcgct	gcgcttcacc	ccgcacgggg	tgacctgggg	ccacgcgggc	1920
gggtctccgc	acaatagcta	ctccttagat	cctgggctcc	tgccaccggc	tgcccaagcc	1980
ttcaggggaa	agcggcgggg	cctcttttct	tatttggtta	atztatggcg	agaggctggg	2040
ttcccggacg						

71662147.APP

```

ggaaggggatg gcagaggagg gaccgcgact gaaaatgggg gcggggggcg gcggttaaag 2100
gagttgcccg aggcggcggc gcgggtgatg tcagctctcg acgaaaatag agagggatcg 2160
cctgcaaatc cccagctccg gcgggggctaa accttgcaat ccctccctgg ccggcgccga 2220
gccagagcgc agcggcctcc accgcctccc caggcgcgca cacaccgca cacgcgcacg 2280
cacgctcacc gtcctctgcc accactctct gctcccgcga ctcgccgcgc ccgcgagccc 2340
cgagcaaaag cacaggtggc agcggctgca ggggcgcatc gccggcgctg gccctcctgc 2400
agccctgggc gcatcgctct ctcggggaag ccaccctcgg agcccccgga gctc 2454

```

<210> 4

<211> 861

<212> DNA

<213> Homo sapiens

<400> 4

```

cccgggtctc cgcgcggtcg cctgcgcttc accccgcacg gggtgacctg gggccacgcg 60
ggcttcaggg gaaacaatag ctactcctta gatcctgggc tcctgccacc ggctgcccga 120
gccttcccgg acgagcggcg gggcctcttt tcttatttgg ctaatttatg gcgagaggct 180
gggggaaggg atggcagagg agggaccgcg actgaaaatg ggggcggggg gcggcggtta 240
aaggagttag ccgagggcggc ggcgcggttg atgtcagctc tcgacgaaaa tagagaggga 300
tcgcctgcaa atccccagct ccggcggggc taaaccttgc aatccctccc tggccggcgc 360
cgagccagag cgagcgggcc tccaccgcct ccccaggcgc gcacacaccc gcacacgcgc 420
acgcacgctc accgtcctct gccaccactc tctgctcccg cactcgccg cgcccgcgag 480
ccccgcagca aagcacaggt ggcagcggct gcaggggcgc atcgccggcg tgcgccctcc 540
tgagccctg ggcgcacgc tctctcgggg aagccaccct cggagcccc ggagctcccc 600
gccaagcgcc atccccgcgg gcggagggga gcgcgggtcg cgcgccgtgg agagccggga 660
cgcggttag cgcccgagg agcctcctgc gcccgttag gcgctaaagg gcttaccctcg 720
gaggcggtg gaagggcggg cagaggctcc tcttaaatac cgctcccggc cgcaacttcgc 780
gctcaccctg gcgtccgctt tctccctcgc ccacagctgc cggatagtgc tgaagaggag 840
ggggcgttcc ccagaccatg g 861

```